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Marat V. Markin* (mmarkin@csufresno.edu), Department of Mathematics, California State University, Fresno, 5245 North Backer Avenue, M/S PB108, Fresno, CA 93740-8001. *On the Smoothness of Weak Solutions of an Abstract Evolution Equation with a Scalar Type Spectral Operator on the Real Axis*. Preliminary report.

Given the abstract evolution equation

$$y'(t) = Ay(t), \quad t \in \mathbb{R},$$

with *scalar type spectral operator* A in a complex Banach space, found are conditions *necessary and sufficient* for all *weak solutions* of the equation, which a priori need not be strongly differentiable, to be *strongly infinite differentiable* or *strongly Gevrey ultradifferentiable* of order $\beta \geq 1$, in particular *analytic* or *entire*, on \mathbb{R} . Also, revealed are certain interesting inherent smoothness improvement effects. The important case of the equation with a *normal operator* A in a complex Hilbert space is immediately obtained as a particular one. (Received September 20, 2018)